

cases by Drs. Hughes Bennett, Buzzard, and Urquhart. Dr. Ferrier gives an analysis of an important memoir by Dr. Duret, "On the Mechanism of Cerebral Concussion and Compression," and Dr. Bucknill reviews severely, but not beyond its deserts, a work by Dr. Bateman, intitled "Darwinism Tested by Language," in which the main point sought to be established against Darwin and evolution is the immateriality of the faculty of speech, and its being a distinctive attribute of man.

Several shorter notices are given of recent papers and lectures relating to the brain and nervous system. These might, with advantage, have been much more numerous, and we hope to see this part of the programme more completely carried out in subsequent numbers.

The original articles would require each a separate analysis to do them justice. We content ourselves in the meantime with merely mentioning their titles. They are all worthy of attentive study, and many of a high standard of excellence, as might indeed be expected from the names of the contributors.

While the majority of the articles in *Brain* are of special interest to physiologists and medical men, they will, at the same time, prove a rich field of material for those—a rapidly increasing army—who believe that psychology is to be advanced, not merely by interrogating consciousness, but by intelligent study of the relations between body and mind, as indicated by physiological research and the phenomena of disease.

While philosophical speculation has interest but for very few of the medical profession, the facts relating to diseases of the nervous system daily observed by medical men, and reported and commented on in a journal like *Brain*, ought to prove of value to all students of the problems of physio-psychology.

We heartily wish *Brain* all success and prosperity in its career.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The New "Oil Immersion" Object-Glass Constructed by Carl Zeiss, of Jena

By the courtesy of its manufacturer, this remarkable lens was sent me, a fortnight since, that I might carefully examine it. The results may be of interest to those who have not seen the lens : and the statement of them is due to the industry and skill of the maker.

The lens has a focal length of one-eighth of an inch : it is an "immersion," but the fluid employed is the oil of cedar wood. The object of this is that the fluid placed between the lens and the covering glass of the object, may have refractive and dispersive indices as nearly as possible coincident with those of crown glass, the material of which the covers and the front lens are composed. *Ol. ligni cedri* is the liquid that has been found to be most capable of meeting these conditions ; and by its use the covering glass, thick or thin, and the oil and lens, become practically one homogeneous whole ; and the need for the "screw collar correction" for different thicknesses of cover, is done away. At the same time, and by the same means, a large and efficient "angle of aperture" is secured. Mr. J. W. Stephenson, F.R.M.S., suggested to Prof. Abbe this method, and Prof. Abbe and Carl Zeiss have together produced the glass.

As a piece of workmanship it is extremely fine ; and it can be used with quite as much ease as an ordinary immersion $\frac{1}{4}$ -inch objective. It works admirably with Powell and Lealand's ordinary sub-stage condenser, with Wenham's reflex illuminator, and with the small plano-convex lens which the maker sends with it to be fastened to the under surface of the slide with the oil of cedar wood. But I have also secured admirable results with the illuminating lens of Powell and Lealand's supplementary stage, which gives entire command over the angle of the illuminating ray.

The "spherical aberration" in this lens is beautifully corrected ; the "field" being perfectly flat. The colour corrections are, so far as the lens goes, equally perfect ; but are somewhat conditioned by the dispersive power of the oil, which can be modified readily, and for which Carl Zeiss provides. The sharpness and brilliance of the "definition" which this lens yields is absolutely unsurpassed, in my experience ; and it has a very great power of "penetration."

I tested it with a series of "tests" with which I have proved and compared the glasses of various makers in England, the Continent, and America for some years. Up to the time of receiving this lens, the $\frac{1}{4}$ -inch that had done the most in my hands, was one of the "new formula" lenses of Powell and Lealand. It is but justice to say that all my most crucial tests were equally mastered by the lens of Carl Zeiss. I have not been able to do more with it, than with the English glass, *but the same results can be accomplished much more readily*. The correction has to be brought into operation, and careful adjustment made, to get the finest result with the English lens ; but the German glass has simply to be brought into focus, and the best result is before the observer, provided that the light has been adjusted in the most efficient manner. It is true that for sharp and perfect definition we must be careful to adjust the length of the draw-tube ; in working this lens there is much need of attention to this matter ; and speaking from a practical point of view, it takes the place, in securing crisp definition, of the screw-collar adjustment ; although, of course, much easier of application. But it is so easy to work the lens with fine results on the more delicate tests, that I think that those who make the resolution of these their primary object in the possession of a microscope, can scarcely fail in securing their utmost desire. It is a glass pre-eminently suited for the resolution of difficult lined or beaded objects.

I have in my cabinet several frustules of *Navicula rhomboides* ("*N. crassinervis*") which I cannot fully resolve with Powell and Lealand's new formula $\frac{1}{2}$ -inch objective. But all that I can resolve with the English $\frac{1}{4}$ I have resolved with the German glass. *Amphipleura pellucida* is easily resolved into delicate beads when the frustules are moderately coarse ; and almost any that can be met with are resolvable into lines ; and this when these diatoms are mounted in balsam. And the highest eyepieces made may be used without any practical detriment to the image ; although, of course, with a reduced sharpness of the definition.

On the whole, I think it in many senses the finest lens, of its power, that I have ever seen ; and in every sense it is an admirable acquisition.

But it is a fact that even water "immersion" lenses are of very limited service in observations continuously conducted upon minute living organisms in fluid. We may gladly call in their aid, in the determination of a delicate change of form, or in the more perfect detection and definition, of an obscure point of structure ; but for steady and constant work we are bound to avoid them ; for the fluid under the delicate cover is in danger every moment of being "flooded" by coming into contact with the water on the top of the cover, and, between it and the lens ; because, the movements of the organism have to be counteracted by the movements of the mechanical stage, in order to keep any form that may be studied in view constantly. But this opens to us the possibility of going to the edge of the cover at any moment ; and thus, by the mingling of the fluids, rendering the observation void. This, of course, will apply still more fully when, as in the case of the valuable glass of Zeiss, the "immersion fluid" is an essential oil.

Happily it is only in special cases that the greater analysing power, combined with larger working distance, which is possessed by immersion lenses, is required. It is in the earlier study of an organism, and before continuous work upon it has begun. And even if it be not, in the majority of cases, a first-class dry English lens of a higher magnifying power, if efficiently

used, accomplishes all that is required. Hence the fine "new formula" lenses, *dry* (also provided with fronts to be used as immersion lenses), are as yet an unsurpassed boon for this special class of work. And certainly it is one which, in relation to biology, has a most important future. I know of course, that the optician has irresistible limitations to deal with; but the "new formula" dry lenses I have referred to, prove, in comparison with the preceding lenses, made by the same firm, that the dry lens was capable of most serviceable improvement. The same applies to a $\frac{1}{15}$ -inch lens, made recently at my request by the same skilful makers. As an analytical optical instrument, it is possessed of capacities far greater than are represented by its mere increase of magnifying power over the $\frac{1}{25}$ -inch objective, by the same makers; and equally so in relation to their $\frac{1}{10}$ ths of six or seven years ago, when the superior magnifying power of the latter is considered. And yet the $\frac{1}{15}$ -inch and the $\frac{1}{10}$ -inch to which I refer, were admirable glasses, and have done excellent service. What is important, therefore, is that the larger demand for lenses that will "resolve" readily, difficult lined and beaded objects, which can certainly be best done, all things being equal, with "immersion" lenses; and to the improved manufacture of which Carl Zeiss' oil immersion gives apparently a new departure: should not lead the best opticians in England, the Continent, and America to abandon efforts for the still greater improvement of their dry lenses. They are of the greatest value to the practical biologist, working amidst the minutest living things in Nature, and from the study of which so much may be anticipated.

There is another feature in the use of this lens which is a drawback. The essential oil is a solvent of most of the varnishes and gums used in mounting, and "finishing," microscopical "slides;" and consequently some of our cherished "tests"—placed near the edge of the cover, and which we have been in the habit of using for years, will not serve us. And this, of course, has a wider application. But this may be overcome by coating the edge with shellac-varnish, which the oil does not dissolve; only this is extremely brittle, and is not to be depended on.

But it is further necessary, in using this lens, that the objects should be mounted in balsam, or some other fluid with an equal refractive index. The majority of "dry" mounted objects are by no means better shown by this lens than by an ordinary immersion lens. But this may be overcome if the objects, such as frustules of diatoms, be "burnt" on to the cover. This intimately unites the crown glass cover and the object, making them practically one. If this be not done the ray coming from the object has to enter air before passing into the lens, so neutralising the special properties of the glass. But here again the special objects—used, for example, as "tests"—and obtained as the result of years of careful selection, are of no avail.

But this glass will be of great value in the study of rock structures, &c., because the oil will render them transparent without special polishing; and its great working distance will in such work be a great boon.

It may perhaps be right to note that this lens, although not provided with the complex arrangement of "screw-collar adjustment," and although only "immersion," is higher in price than the most costly $\frac{1}{10}$ th by any English maker, although the latter lens may have the screw collar correction, and be both "immersion" and dry.

W. H. DALLINGER
St. James's Parsonage, Woolton, Liverpool, May 1

Science for Artists

IN NATURE, vol. xviii. p. 29, there is an article upon "Physical Science for Artists," in which one of my pictures is thus described: "No. 309. The Sunrise Gun, Castle Cornet, Guernsey—Tristram Ellis. Sky colour good; impossible colour of water under sky conditions given."

It is not usual for an artist to answer a criticism, but in this instance I do so purely upon scientific grounds. The water shown is slightly ruffled with a breeze blowing *towards* the spectator, and hence reflects a part of the sky which makes a greater angle above the horizon than the reflection makes below it. The central part of the sea would reflect that portion of the sky which is at the very top of the picture, and if the critic will kindly re-examine, he will find the colours of those parts almost identical. As the sky gets greener towards the zenith with the given kind of sunrise, the sea appears greener than the portion of the sky shown, and this effect is heightened by the strong green local

colour of the water in the *shadows*. The sea was painted after careful consideration and study direct from nature, and remembering the breeze is nearly parallel with the line of vision, is, I think, correct. If the wind had been at right angles to this line the colour would have been quite different, and perhaps this is a matter which the writer of the article did not at the moment take into consideration.

TRISTRAM ELLIS

Kensington, May 10

Time and Longitude

THERE is a practical answer to the problem put by Mr. Latimer Clark (NATURE, vol. xviii. p. 40). As a matter of fact the day begins, or rather the day is first named at the 180° meridian east or west from Greenwich; but this initial line, if I may call it so, diverges in the South Pacific to about 170° west from Greenwich, bringing many of the islands, as Fiji, Friendly, Sunday, Chatham, &c., into the same date with the nearest civilisation, Australia and New Zealand, Asia, &c. Without notes I cannot trace this line accurately between the Isles, but to take certain cases. Fiji counts its day east from Greenwich, Hawaii and Society west from Greenwich. At this moment I forgot which division the Navigators enter, so to answer the problem, Where did last Monday begin?—At about 170° west longitude. Where did it end?—At 180° west in North Pacific. How long did it exist?—At any one place twenty-four hours, but taking adjacent places on either side of the initial line, Monday will have been a date during forty-eight hours; or if a vessel should be just on the eastern side of the 180° meridian, and keeping, as she should, Greenwich time through American route, Monday will have been a date during very nearly forty-nine hours.

The case proposed by Mr. Latimer Clark is no hypothetical one. During the war of 1855 the squadron in the Pacific was sent across to co-operate with the fleet in China. It found itself a day behind the China fleet as it had entered the Pacific round Cape Horn, whilst the China fleet had passed round the Cape of Good Hope, and for a short time the two fleets side by side kept different days. Again the steamers from San Francisco to Japan alter their dates temporarily whilst in Japan to suit the local reckoning, and enter both dates in the log. J. P. MACLEAR

May 13

Menziesia Cærulea

I AM rather surprised to see it stated by the Rev. M. J. Berkeley in NATURE (vol. xviii. p. 15) that the late "Dr. Thomas Thomson was so fortunate, after three times ascending the Sow of Atholl, as to *rediscover* the long lost Menziesia cærulea." I doubt if it was ever lost, certainly it has not been long lost. I find, on looking over my Herbarium, that my specimen was collected August 6, 1867; since then I have heard of it having been found by others. I saw several plants which I left, and I have little doubt that some of them are there still. Fortunately the preservation of the plant is due to the following circumstances:—1st. That it flowers in May; few botanists visit the Highlands till later in the year. 2nd. The plant has a considerable general resemblance to *Empetrum nigrum*. I have seen them growing in the *same tuft*; in such a case it requires a very sharp eye to distinguish one from the other even at a short distance. 3. The plants are *widely scattered* over the hill, so that it would require days to enable any one to say that it was lost; indeed no plant is likely to be lost so long as the natural conditions remain unchanged. It may be stolen but not lost. I take for granted, of course, that every true botanist will be merciful in such a case.

Edinburgh, May 6

ALEX. CRAIG CHRISTIE

"Hermetically Sealed"

WHAT is hermetic sealing? I have been under the belief that it means sealing with the material composing the object to be sealed; as in the case of sealing a glass tube in the spirit-lamp. M. Bordier's charming paper on the Greenland Eskimo (NATURE, vol. xviii. p. 16), says that an aperture in a hut is hermetically sealed with goldbeater's skin; and that a fisherman is hermetically enveloped round the loins by a leatheren bag. You may, perhaps, think it worth while, in the interest of accurate scientific terminology, to settle the point.

W. T.

May 10